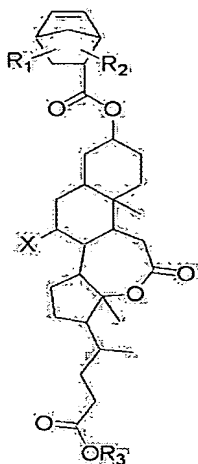


[0090] WHAT IS CLAIMED IS:

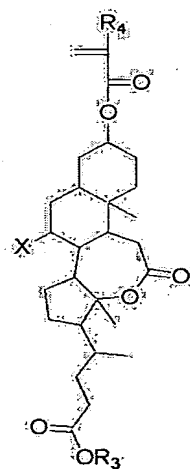
1. A norbornene monomer represented by Formula (I):



(I)

wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>4</sub> are each independently hydrogen, C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy or phenyl; R<sub>3</sub> is hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> alkoxy, phenyl, C<sub>1-20</sub> hydroxyalkyl, C<sub>1-20</sub> alkoxyalkyl, C<sub>6-30</sub> alicyclic hydrocarbon or C<sub>6-30</sub> aliphatic lactone; and X is hydrogen or hydroxyl.

2. An acrylate or methacrylate monomer represented by Formula (II):

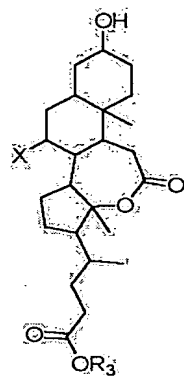


(II)

wherein R<sub>1</sub>, R<sub>2</sub> and R<sub>4</sub> are each independently hydrogen, C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy or phenyl; R<sub>3</sub> is hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> alkoxy, phenyl, C<sub>1-20</sub>

hydroxyalkyl, C<sub>1-20</sub> alkoxyalkyl, C<sub>6-30</sub> alicyclic hydrocarbon or C<sub>6-30</sub> aliphatic lactone; and X is hydrogen or hydroxyl.

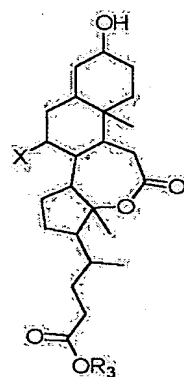
3. An alcoholic compound represented by Formula (III):



(III)

wherein R<sub>3</sub> is hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> alkoxy, phenyl, C<sub>1-20</sub> hydroxyalkyl, C<sub>1-20</sub> alkoxyalkyl, C<sub>6-30</sub> alicyclic hydrocarbon or C<sub>6-30</sub> aliphatic lactone; and X is hydrogen or hydroxyl.

4. A method of preparing the monomer of Formula (I) as defined in claim 1 by reacting the alcoholic compound represented by Formula (III):

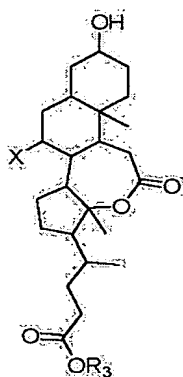


(III)

wherein R<sub>3</sub> is hydrogen, C<sub>1-20</sub> alkyl, C<sub>1-20</sub> alkoxy, phenyl, C<sub>1-20</sub> hydroxyalkyl, C<sub>1-20</sub> alkoxyalkyl, C<sub>6-30</sub> alicyclic hydrocarbon or C<sub>6-30</sub> aliphatic lactone; and X is hydrogen or hydroxyl,

with a compound selected from 2-chlorocarbonyl-5-norbornene, acryloyl chloride and methacryloyl chloride.

5. A method of preparing the monomer of Formula (II) as defined in claim 2 by reacting the alcoholic compound represented by Formula (III):

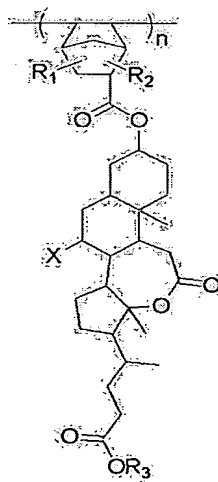


(III)

wherein  $R_3$  is hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  alkoxy, phenyl,  $C_{1-20}$  hydroxyalkyl,  $C_{1-20}$  alkoxyalkyl,  $C_{6-30}$  alicyclic hydrocarbon or  $C_{6-30}$  aliphatic lactone; and X is hydrogen or hydroxyl,

with a compound selected from 2-chlorocarbonyl-5-norbornene, acryloyl chloride and methacryloyl chloride.

6. A polymer represented by Formula (IV):

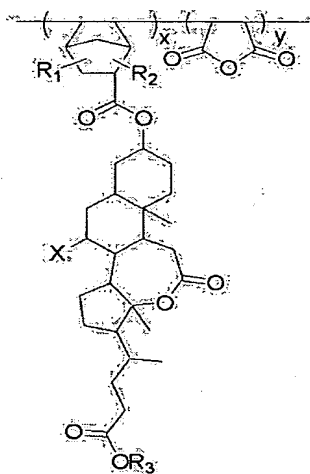


(IV)

wherein  $R_1$ ,  $R_2$  and  $R_4$  are each independently hydrogen,  $C_{1-4}$  alkyl,  $C_{1-4}$  alkoxy or phenyl;  $R_3$  is hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  alkoxy, phenyl,  $C_{1-20}$  hydroxyalkyl,  $C_{1-20}$  alkoxyalkyl,  $C_{6-30}$  alicyclic hydrocarbon or  $C_{6-30}$  aliphatic lactone;  $X$  is hydrogen or a hydroxyl; and  $n$  represents the degree of polymerization and is an integer from 1 to 1000.

7. A photoresist composition comprising the polymer of Formula (IV) in claim 6, and a photoacid generator.

8. A polymer represented by Formula (V):

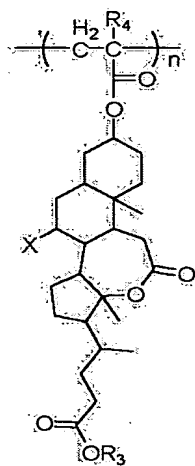


(V)

wherein  $R_1$ ,  $R_2$  and  $R_4$  are each independently hydrogen,  $C_{1-4}$  alkyl,  $C_{1-4}$  alkoxy or phenyl;  $R_3$  is hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  alkoxy, phenyl,  $C_{1-20}$  hydroxyalkyl,  $C_{1-20}$  alkoxyalkyl,  $C_{6-30}$  alicyclic hydrocarbon or  $C_{6-30}$  aliphatic lactone;  $X$  is hydrogen or hydroxyl; and  $x$  and  $y$  each represents a molar ratio of each monomer unit and the sum  $x + y$  is 1.

9. A photoresist composition comprising the polymer of Formula (V) as defined in claim 8, and a photoacid generator.

10. A polymer represented by Formula (VI):



(VI)

wherein  $R_1$ ,  $R_2$  and  $R_4$  are each independently hydrogen,  $C_{1-4}$  alkyl,  $C_{1-4}$  alkoxy or phenyl;  $R_3$  is hydrogen,  $C_{1-20}$  alkyl,  $C_{1-20}$  alkoxy, phenyl,  $C_{1-20}$  hydroxyalkyl,  $C_{1-20}$  alkoxyalkyl,  $C_{6-30}$  alicyclic hydrocarbon or  $C_{6-30}$  aliphatic lactone;  $X$  is hydrogen or hydroxyl; and  $n$  represents the degree of polymerization and is an integer from 1 to 1000.

11. A photoresist composition comprising the polymer of Formula (VI) as defined in claim 10, and a photoacid generator.

12. A method of preparing a photoresist composition, comprising:  
homopolymerizing the norbornene monomer of Formula (I) as defined in claim 1, or copolymerizing the monomer of Formula (I) and maleic anhydride, to prepare a polymer; and  
dissolving the polymer and a photoacid generator in a solvent.

13. A method of preparing a photoresist composition, comprising:  
homopolymerizing the monomer of Formula (II) as defined in claim 2, or copolymerizing the monomer of Formula (II) and maleic anhydride, to prepare a polymer; and  
dissolving the polymer and a photoacid generator in a solvent.

14. A method of preparing a photoresist composition, comprising:  
mixing the monomer of Formula (II) as defined in claim 2, and  
an acrylate or methacrylate monomer containing an alicyclic hydrocarbon or  
aliphatic lactone group, to prepare a polymer; and  
dissolving the polymer and a photoacid generator in a solvent.

15. The photoresist composition of claim 7, wherein the photoacid  
generator is added in an amount of about 0.01% to about 20% by weight,  
based on the weight of the polymer.

16. The photoresist composition of claim 9, wherein the photoacid  
generator is added in an amount of about 0.01% to about 20% by weight,  
based on the weight of the polymer.

17. The photoresist composition of claim 11, wherein the photoacid  
generator is added in an amount of about 0.01% to about 20% by weight,  
based on the weight of the polymer.

18. The method of claim 12, wherein the solvent is used in an  
amount of about 10% to about 1000% by weight, based on the weight of the  
polymer.

19. The method of claim 13, wherein the solvent is used in an  
amount of about 10% to about 1000% by weight, based on the weight of the  
polymer.

20. The method of claim 14, wherein the solvent is used in an  
amount of about 10% to about 1000% by weight, based on the weight of the  
polymer.

21. A method of forming photoresist patterns, comprising:

- (a) applying the photoresist composition of claim 7 on a substrate, to form a photoresist film;
- (b) exposing the photoresist film to light;
- (c) baking the exposed photoresist film; and
- (d) developing the baked photoresist film to form desired patterns.

22. A method of forming photoresist patterns, comprising:

- (a) applying the photoresist composition of claim 9 on a substrate, to form a photoresist film;
- (b) exposing the photoresist film to light;
- (c) baking the exposed photoresist film; and
- (d) developing the baked photoresist film to form desired patterns.

23. A method of forming photoresist patterns, comprising:

- (a) applying the photoresist composition of claim 11 on a substrate, to form a photoresist film;
- (b) exposing the photoresist film to light;
- (c) baking the exposed photoresist film; and
- (d) developing the baked photoresist film to form desired patterns

24. The method of claim 21, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

25. The method of claim 22, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

26. The method of claim 23, wherein the baking in (c) is carried out at about 60 °C to about 140°C.

27. The method of claim 21, wherein the exposing in (b) is carried out by using a far ultraviolet, an F<sub>2</sub> excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

28. The method of claim 22, wherein the exposing in (b) is carried out by using a far ultraviolet, an F<sub>2</sub> excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

29. The method of claim 23, wherein the exposing in (b) is carried out by using a far ultraviolet, an F<sub>2</sub> excimer laser, an extreme UV, an e-beam, an X-ray or an ion beam light source.

30. A semiconductor device fabricated by the method of claim 21.

31. A semiconductor device fabricated by the method of claim 22.

32. A semiconductor device fabricated by the method of claim 23.